

PDPG-A

AUTOMATED DEAD-WEIGHT TESTER



Dead-Weight Tester is used as a generator of an accurately known pressure. It measures pressure as force per unit area. Therefore, Dead-Weight Tester is the most accurate pressure calibrator.

- Pressure ranges Oil 10 / 25 / 50 / 100 MPa
- Automated Mass Handling Unit
- 0.008% of uncertainty
- Wing-type special designed cylinder
- Piston Cylinder Modular designed
- Quick & Easy installation of Piston/Cylinder
- 9 LED for piston float-position display
- Automatic-Intelligent piston rotation
- Separated from the main unit and the pressure regulator can be used for various purposes.
- P/C Temperature accuracy
 - better than ± 0.2 °C
- Small size for easy movement during calibration
- Easy to assemble and disassemble

Automated Dead-Weight Tester is much more convenient than normal manual Dead-Weight Tester. PDPG-A provides automated mass handling system with precision parts and high-end technology for better, easier and accurate calibration.

To install the masses, a binary mass loading tray is placed on the piston cap and a mass bell is installed over the tray. The mass set's main mass discs are hung from the mass bell. Binary masses are placed in descending sequence on the mass bell hanger and on the tray.

To load a specific mass value, the mass handling system raises the entire mass load above the piston upper end of stroke to the mass selection position. The mass is raised by two types of a pneumatically actuated lifter acting on a lifter shaft connected to the bell and binary mass spindle. Each mass that is not to be loaded is held in place by engaging three selector pins. When the mass selection is complete, the lifter moves down, placing the lifter shaft, binary spindle, bell and all the released masses onto the piston.

The PDPG-A mass handling system is designed and tested to provide years of reliable, maintenance free mass manipulation.

Control of the mass handling system is integrated into PDPG-A's intelligent operation. In pressure entry mode, when a target pressure command is entered from the front panel or remotely, PDPG-A calculates the mass required to achieve the target pressure. It then stops piston rotation and loads the mass value by sending a command to the PDPG-A. The true value of mass loaded and exact pressure value achieved are reported and updated real time.

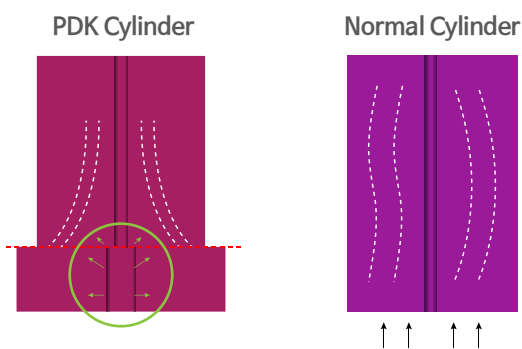
This type of automated mass handling system is the fastest mass loading system in the world.

Use standard pressure controllers to automate pressure control and make fully automated piston gauge operation a reality.

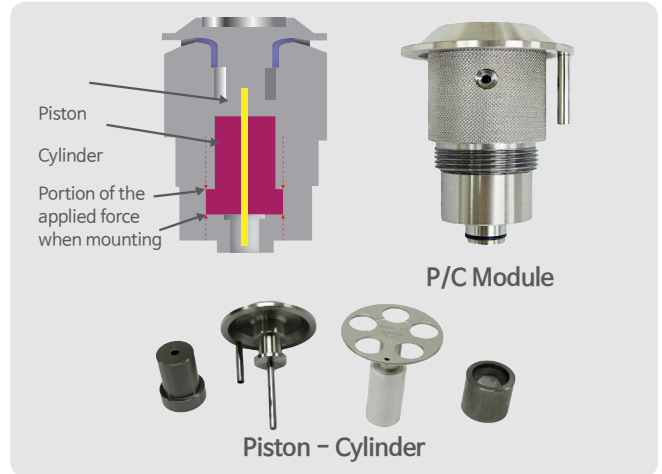
Wing type P/C is the most optimized and modernized design for piston-cylinder unit.

A protrusion on the cylinder face enables easy and firm installation to the mount.

Unique end shape of cylinder hole assures excellent metrological characteristics.

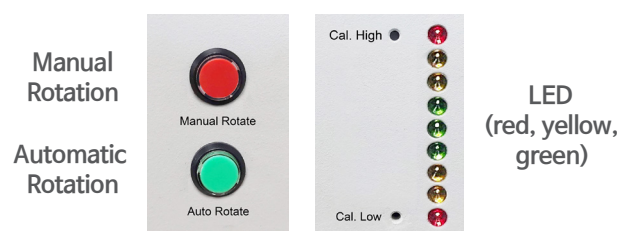


PDK's patented cylinder (Korea, 10-0449151) is made of tungsten carbide. PDK's piston-cylinder shows high precision and stability. The modular piston-cylinder unit can be replaced by hands very easily and quickly without special tool. It also as excellent structure which prevents environmental contamination from outside.



In order to measure the accurate temperature of the piston-cylinder, precision platinum resistance temperature sensor is equipped with uncertainty of 0.2 °C. Incorrect measurement of the piston cylinder temperature about 1 °C gives pressure error around 9 ppm. PDPG temperature sensor is located at the easy place to remove for calibration.

In order to monitor the float position of piston, non-contact height sensor was developed. In total, 9 LEDs are attached on the front panel of PDK's PDPG. Each LED will be lighting at 1 mm interval according to piston movement. When green LED is shining, it indicates "measurement available."



In order to rotate piston, two methods are available. The first one is to press the red button on the front panel of PDPG. The piston can be rotated only when you want to rotate. Second method is to press the green button. When the piston is located in a suitable operation position, the piston rotates automatically. The operation interval covers ± 3 mm from reference float line. If out of range, piston stops automatically.

Pressure generator / controller is separated with PDPG. Then if valve is mounted on connection, Pressure generator / controller can be Comparator or Comparison Tester therefore it can saving the additional cost.

For Hydraulic, pressure generator / controller consists of pump priming pump and a precision spindle pump. O-ring designed for high-pressure structure of almost no internal leakage, a torque of the lowest among the same class and during long-term use, it will needs less power in high pressure up to more than 200 MPa. Available installed pressure generator / controller which is special designed by PDK.



OPS-J for Oil
Manual hydraulic pressure
Generator / Controller

For Dead-weight tester, Comparator and Comparison Tester
 · Pressure control range:
 up to 200 MPa
 · Lever type priming pump:
 up to 40 MPa
 For pressure generation and adjustment systems that required very precise pressure regulation quick & easy to use.



OPS-H for Oil
Manual hydraulic pressure
Generator / Controller

For Dead-weight tester, Comparator and Comparison Tester
 · Pressure control range:
 up to 200 MPa
 · Pneumatic pump priming:
 up to 100 MPa
 For pressure generation and adjustment systems that required very precise pressure regulation quick & easy to use.



OPS-2 for Oil
Generator / Controller

For Dead-weight tester, Comparator and Comparison Tester
 · Pressure control range:
 up to 300 MPa
 · Pneumatic pump priming:
 up to 200 MPa
 For pressure generation and adjustment systems that required very precise pressure regulation joystick pressure control



MPC-70 for Gas
Manual pneumatic
pressure Controller

For Dead-weight tester, Comparator and Comparison Tester (Precision control)
 · Pressure control range:
 vacuum to 7 MPa
 For pressure generation and adjustment systems that required very precise pressure regulation quick & easy to use.

Pressure Unit	MPa	4.059998 MPa												
Piston Cylinder	19180E													
Max. Pressure	10.1920													
Min. Pressure	0.020													
Mass Resolution	0.1 g													
Head Correction	0													
Mass (kg)		20.3 + 18.7 g												
Piston 0.1 kg	Bell 0.4 kg	Makeup 4.5kg	0.1 kg	<table border="1"> <tr><td>Atm. Press. (hPa)</td><td>1012.6</td></tr> <tr><td>Atm. Humidity (RH%)</td><td>34.3</td></tr> <tr><td>Atm. Temp. (°C)</td><td>18.1</td></tr> <tr><td>Piston Cylinder Temp. (°C)</td><td>16.4</td></tr> <tr><td>Piston Position (mm)</td><td>5.5</td></tr> </table>	Atm. Press. (hPa)	1012.6	Atm. Humidity (RH%)	34.3	Atm. Temp. (°C)	18.1	Piston Cylinder Temp. (°C)	16.4	Piston Position (mm)	5.5
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0.2 kg-1	0.2 kg-2	0.5 kg	1 kg											
2 kg-1	2 kg-2	5 kg-1	5 kg-2											
5 kg-3	5 kg-4	5 kg-5	5 kg-6											
5 kg-7	5 kg-8	5 kg-9												

PDPG-A terminal is remote control unit for automated Dead-Weight Tester.

When user set target pressure on PDPG-A Terminal, it calculates the mass required to achieve the target pressure and the true value of mass loaded and exact pressure value achieved are reported and updated real time.

PDPG-A equipped environment temperature sensor, humidity sensor and atmosphere sensor for buoyancy correction about current loaded mass by automatic air density. It also can measures the piston cylinder temperature for automatic calculation about coefficient of expansion for each temperature value then shows real-time current defined reference pressure with various pressure units. PDPG-A terminal shows piston location (Height) and current loaded mass information for help to get pressure calibration data intuitively.

01 Specification

Maximum Pressure	Oil - up to 100 MPa
Measurement uncertainty	0.008 % of reading
Piston cylinder material	Tungsten carbide
Mass changing time	<10 sec
Drive air supply	>500 kPa 'shop air'
Units	MPa (main), kPa, bar, kgf/cm ² , psi and etc.
Size	420 W x 350 D x 500 H
Mass material	Stainless Steel
Mass set	Oil - Total 50 kg (Standard)
Test port	Oil - 9/16" UNF Cone & Thread (AE F250C, HIP HF4)
Media	Oil (Sebacate Oil recommended)
Workable temperature / Storage temperature	10 °C ~ 35 °C / -20 °C ~ 70 °C
Workable Humidity / Storage Humidity	20 %RH ~ 75 %RH / 0 %RH ~ 90 %RH
Power Requirements	220 Vac, 50/60 Hz

Oil pressure P/C and pressure range

Piston	Pressure	Min pressure	Max Pressure	Min increasement pressure(Automated)
	0.2 MPa / kg	0.2 MPa	10 MPa	0.02 MPa
	0.5 MPa / kg	0.5 MPa	25 MPa	0.05 MPa
	1 MPa / kg	1 MPa	50 MPa	0.1 MPa
	2 MPa / kg	2 MPa	100 MPa	0.2 MPa

02 Order Information

Model / Description
PDPG-A - PISTON Oil Automated Dead-Weight Tester ** User must supplied local acceleration of gravity when order.

03 Option

- Pressure generator / controller

OPS-J (Oil Standard)
OPS-1
OPS-H
MPC-70 (Gas)
- Trim Mass F1 grade (10 mg to 50 g, 1-2-2-5 Series)
- Multi test port
- KOLAS Certificated calibration report

04 Accessories

- Main unit and mass set with automated mass handling unit
- Terminal 11" Touch panel
- Piston/Cylinder
- Pressure controller
- Fitting adaptor set
- Sebacate oil
- Power cable



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